

Automotive Technology 6th Edition

Chapter 71 – Ignition System Components and Operation

Lesson Plan

CHAPTER SUMMARY:



1. Ignition systems, ignition system operation, and ignition coils
 2. Ignition switching and triggering, primary circuit operation, and distributor ignition systems
 3. Waste-spark ignition systems, coil-on-plug ignition, and compression-sensing ignition
 4. Ion-sensing ignition, ignition timing, knock sensors, and spark plugs
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OBJECTIVES:



1. Explain how the ignition system and ignition coils work.
 2. Discuss crankshaft position sensor and pickup coil operation.
 3. Describe the operation of distributor ignition.
 4. Describe the operation of waste-spark and coil-on-plug ignition systems.
 5. Discuss ignition control circuits, compression-sensing and ion-sensing ignition, ignition timing, knock sensors, and spark plugs.
 6. This chapter will help prepare for Engine Repair (A8) ASE certification test content area “B” (Ignition System Diagnosis and Repair).
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RESOURCES: (All resources may be found at <http://www.jameshalderman.com>)



1. **Task Sheet ASE (A8-A-2) P-1:** Ignition System Identification
 2. **Task Sheet ASE (A8-A-2) P-1:** Spark Plug Specifications
 3. Chapter PowerPoint
 4. Chapter Crossword Puzzle and Word Search
 5. Animations: Coil-On-Plug Ignition System, Hall Effect Sensor, and Cylinder Deactivation System
 6. Animations: Waste Spark Ignition System 1 and Waste Spark Ignition System 2
 7. Videos: See list at the end of the lesson plan.
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ACTIVITIES:



1. **Task Sheet ASE (A8-A-2) P-1:** Have students complete Ignition System Identification Task Sheet.
 2. **Task Sheet ASE (A8-A-2) P-1:** Have students complete Spark Plug Specifications Task Sheet.
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ASSIGNMENTS:



1. Chapter crossword and word search puzzles.
 2. Complete end of chapter 10 question quiz.
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CLASS DISCUSSION:



1. Review and group discussion chapter Frequently Asked Questions and Tech Tips sections.
 2. Review and group discussion of the five (5) chapter Review Questions.
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NOTES AND EVALUATION:



Videos: (at <http://www.jameshalderman.com>)

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| Cylinder deactivation (time 2:35) | Crankshaft position sensor (time 0:42) |
| Ignition system (time 5:26) | Camshaft position sensor (time 0:42) |
| Basic ignition (time 1:07:57) | Knock sensor (time 0:46) |
| COP ignition system (time 3:00) | Honda V-TEC pressure switch (time 1:43) |
| Electronic ignition distributor (time 2:21) | Honda V-TEC solenoid (time 3:07) |
| Ignition coil signal circuit (time 2:38) | Honda V-TEC operation (time 3:30) |
| Spark plug wires (time 1:20) | Cam and crank sensors and wiring diagrams (time 5:16) |
| Ignition triggers (time 1:03) | Crankshaft sensor (time 5:12) |
| Ignition control module (time 1:02) | Scope testing a crankshaft sensor (time 6:47) |
| Transformers (time 0:49) | Chrysler hall effect sensor testing part (time 14:55) |
| Knock sensor signal circuit (time 1:29) | Chrysler hall effect sensor testing part 2 (time 6:10) |
| Hall effect sensor signal circuit (time 1:36) | Knock sensor testing (time 16:09) |
| Hall effect crank sensor reference voltage circuit (time 1:25) | Testing crankshaft sensors (time 4:39) |
| Hall effect crank sensor (time 1:46) | Testing crankshaft sensors (time 5:00) |
| Phototransistor crank sensor circuit (time 1:22) | Distributor cap and rotor (time 2:57) |
| Magnetic crankshaft sensor signal circuit (time 1:14) | Spark plugs (time 3:25) |
| Magnetic crankshaft sensor reference circuit (time 1:32) | Ignition coil (time 3:40) |
| Cam and Crank sensor circuits (time 1:39) | Spark plugs (time 6:56) |
| Knock sensor (time 0:41) | Spark plugs and oxygen sensors (time 8:30) |
| CMP sensor (time 0:59) | Ignition coil (time 0:53) |
| CKP sensor (time 3:33) | How Ignition System Works (time 4:06) |